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I, KIM MARSHALL, MANAGER PATENT OPERATIONS, hereby certify that the annexed is a true copy of the Provisional specification in connection with Application No. PP 8262 for a patent by ASTRAPAK LIMITED filed on 20 January 1999.

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day of July 1999

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AUSTRALIA

Patents Act 1990

PROVISIONAL SPECIFICATION

Invention Title: **Plug and gland inlet/outlet port**

The invention is described in the following statement:

Plug and Gland Inlet/Outlet Port

Field of the invention

This invention relates to a plug and gland port for an aseptic packaging system of the type described in Australian Provisional Patent Application No. PP 4374. The specification of that application is incorporated herein by way of reference.

Background of the invention

As described in the aforementioned provisional patent application, when sealing of the plug within the gland after the container has been filled, it is most important to ensure that contaminants do not enter the container along a pathway defined at the interface between the gland and the plug. However, it is also important that the plug is relatively easily removable from the gland for filling purposes. Also, after the container has been filled, it is important that the plug is relatively easily insertable into the gland and, once inserted, is relatively easily removable from the gland in order to decant the contents of the container through the gland.

Whilst it is possible to form both the plug and the gland to relatively close tolerances, it is unsafe to rely only on those close tolerances to ensure that the integrity of the seal between the plug and the gland is maintained. Also, if the fit between the plug and the gland is made too tight then insertion of the plug into the gland, and the subsequent removal of the plug from the gland, are made that much more difficult and can lead to failure of the system either on closing or on opening which, in turn, can lead to loss of contents of the container.

Typically the bag and gland will be sterilised internally after manufacture, generally by radiation. It is essential that the interior of the bag is maintained in a sterile condition prior to being filled so that material introduced into the bag is introduced into a sterile environment.

Summary of the invention

According to the invention there is provided a plug and gland port for use on an aseptic container, said port comprising:

- a tubular body having a flow passage therethrough defined by a cylindrical inner wall of the tubular body, and

- a plug for sealing the flow passage, the plug having gripping formations on the outer face thereof, and retaining means or formations thereon for locking the plug into the flow passage,

said retaining means comprising an annular recess formed around the periphery of the plug, and an annular rib or lip formed around and standing proud of the cylindrical inner wall of the tubular body, the rib or lip being adapted to locate in the recess to form a locating and/or sealing engagement with the recess when the plug is operatively installed within the tubular body.

Preferably the annular recess on the plug is at least partially filled with a sealing ring. The sealing ring may be in the form of a low melt sealant deposited in said recess. The low melt sealant may comprise a material such as a polyolefin elastomer.

Preferably the rib or lip on the cylindrical inner wall is spaced a first distance away from the operatively outer end face of the tubular body. Preferably the annular recess on the plug is spaced a second distance away from the operatively outer end face of the plug, said second distance being less than said first distance.

The plug may have a second annular recess formed around the periphery thereof, said second annular recess being spaced from the first annular recess, the second annular recess being spaced a distance away from the operatively outer end face of the plug by a distance which is substantially the same as the distance which the rib or lip is spaced away from the operatively outer end face of the gland so that when the rib or lip is located within the second annular recess the operatively outer end faces of the gland and the plug are substantially flush with each other. Prior to filling the container the gland and plug may be welded together.

The rib or lip may have a generally triangular form in cross section so as to provide a chamfered or severed face in both an outwardly facing direction and an inwardly facing direction to allow for simplified engagement and disengagement of the plug with the gland.

These and further features of the invention will be made apparent from the description of an embodiment thereof and by way of example. The description reference is made to the accompanying drawings but these specific features shown in the drawings should not be construed as limiting on the invention.

Brief description of the drawings

Figure 1 shows a cross sectional side view through a plug and gland port according to the invention prior to filling;

Figure 2 shows an enlargement of the interface between the plug and gland in the position shown in Figure 1;

Figure 3 shows a cross sectional side view of the plug and gland port after the container has been filled; and

Figure 4 shows an enlargement of the interface between the plug and gland in the position shown in Figure 3.

Detailed description of the embodiments

As shown in Figures 1 and 2, a plug and gland port includes a gland 16 and a plug 22. The gland 16 is comprised of a tubular body which defines a passage 14 therethrough and has an inner cylindrical wall 18. The gland 16 is fitted to a wall 12 of a container and fluid material is introduced into the container through the passage 14. The gland 16 has an outer end face 34 and an outwardly directed rib 120 extends around the periphery of the gland. The rib 120 serves to strengthen the gland and ensure that it does not deform during the filling process or when the plug 22 is inserted into or removed from the gland 16.

The plug 22 includes an end wall 24 and a skirt 26, the outer surface of this skirt 26 being a close sliding fit with the cylindrical wall 18. The plug 22 has an upstanding head 30 which is undercut as shown at numeral 32 so that the plug can be gripped and removed from the gland 16 or reinserted into the gland 16 as required.

The radially outer surface of the skirt 26 has a first annular recess 122 formed therein which is filled with an elastomeric sealing ring 124. The sealing ring 124 is preferably formed of a low melt point sealant such as polyolefin elastomer.

The plug 22 and the gland 16 need not be formed of the same material. The gland may, for example, be formed of polyethylene and the plug may be formed of a material such as polypropylene.

The skirt 26 has a second annular recess 126 formed therein located on the radially outer surface of the skirt near the innermost end thereof.

The wall 18 of the gland 16 has an annular rib or lip 128 formed therein which is best seen in Figure 2 of the drawings. It will be noted that the rib 128 has a generally triangular form in cross section so that the outwardly facing surface 130 and the inwardly facing surface 132 both have a tapered or bevelled configuration to facilitate the engagement of the rib 128 in the groove 126. It will be noted that the end 134 of the skirt 26 is also of tapered or bevelled configuration to facilitate the insertion of the skirt into the gland.

In the position shown in Figures 1 and 2 the end face 38 of the plug 22 is flush with the outer end face 34 of the gland 16. This will be the condition prior to the container 12 being filled with material.

If necessary, the plug and the gland may be sealed together, prior to filling, by providing a temporary weld or seal as shown at detail 136 in Figure 2. As is known in the art, the interior of the bag, and the interior of the gland, are sterilised after manufacture by an appropriate sterilisation technique, typically radiation. To ensure the integrity of the seal prior to filling the interface between the plug 22 and the gland 16 may be shaped and welded together as indicated in detail 136 to thereby define a frangible weld 138 at the interface. When it is desired to fill the bag the plug 22 will be removed from the gland 16, breaking the weld 138. However, during filling the region will first have been sterilised in the manner described in Provisional Patent Application No. PP 4374.

After the bag has been filled the plug will be reintroduced into the gland 16, but will be pushed further into the gland, to the position shown in Figures 3 and 4 of the drawings. In this position the recess 122 will be located adjacent the rib 128 so that the rib 128 embeds itself within the elastomeric sealing ring 124. Preferably the elastomeric sealing ring 124 will have been heated during the closing procedure by sterilisation steam introduced against the elastomeric sealing ring 124 after the plug has been partially introduced into the gland. This procedure is described in more detail in Provisional Patent Application No. PP 4374.

After the elastomeric sealing ring 124 has been heated the plug 22 will be pushed further into the gland 16 to the position shown in Figures 3 and 4 wherein the rib 128 is embedded within the elastomeric sealing ring 124. In this position, the elastomeric sealing ring will cool, and at least partially solidify to thereby lock and seal the plug 22 within the gland 16. The material from which the elastomeric sealing ring 124 is made will therefore preferably be of a type which will partially melt or plasticise at steam temperatures in a relatively short period of time.

To remove the plug from the gland 16 the plug will be gripped and pulled outwardly thereby breaking the seal between the sealant 124 and the rib 128.

There may be various alterations to the above described embodiment without departing from the scope of the invention. For example, there may be a plurality of ribs 128 with a corresponding plurality of recesses 122, each filled with a suitable sealant 124 to thereby improve the integrity of the seal. Similarly, the materials from which the plug, the gland, and the sealant are made

could vary from that described herein. Also, necessary variations will need to be made where different packaging systems are employed.

It will be understood that the invention disclosed and defined herein extends to all alternative combinations of two or more of the individual features mentioned or evident from the text or drawings. All of these different combinations constitute various alternative aspects of the invention.

The foregoing describes embodiments of the present invention and modifications, obvious to those skilled in the art can be made thereto, without departing from the scope of the present invention.

Dated this 20th day of January 1999



Astrapak Pty Ltd
by its attorneys
Freehills Patent Attorneys

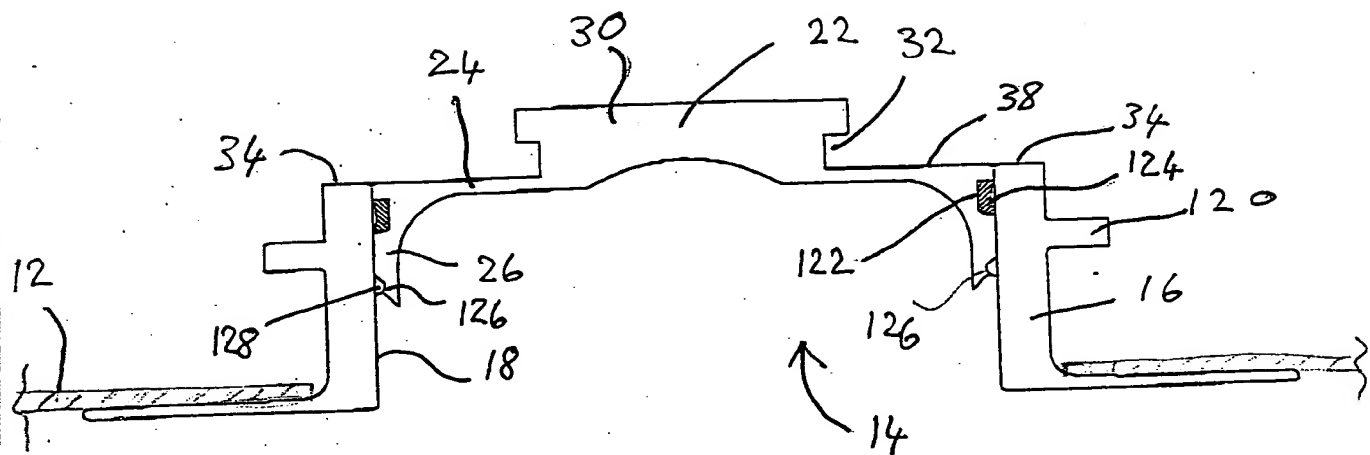


Fig 1

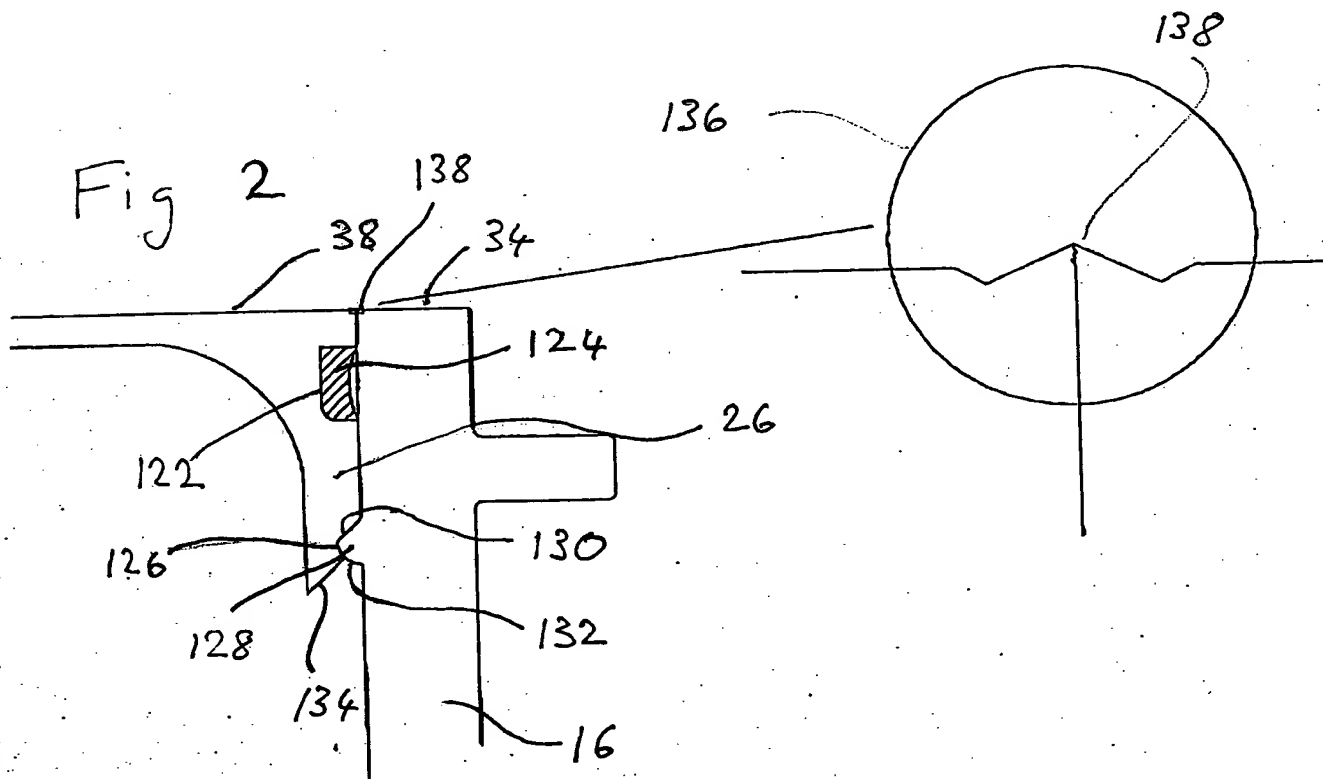


Fig 2

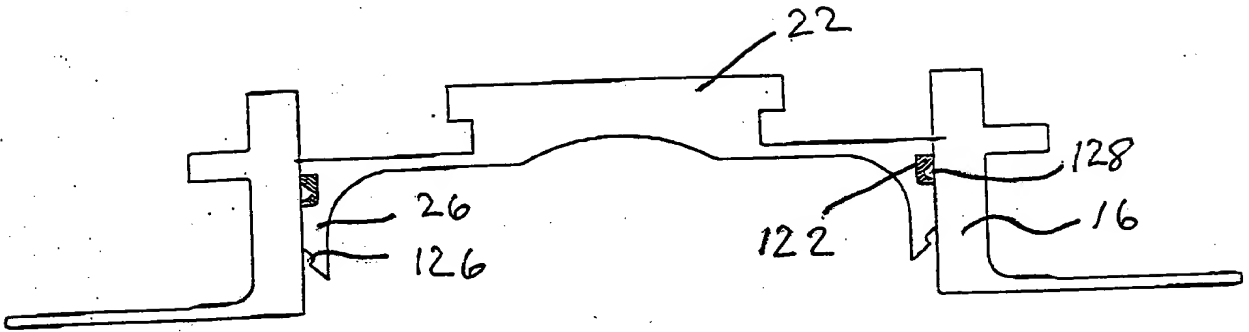


Fig 3

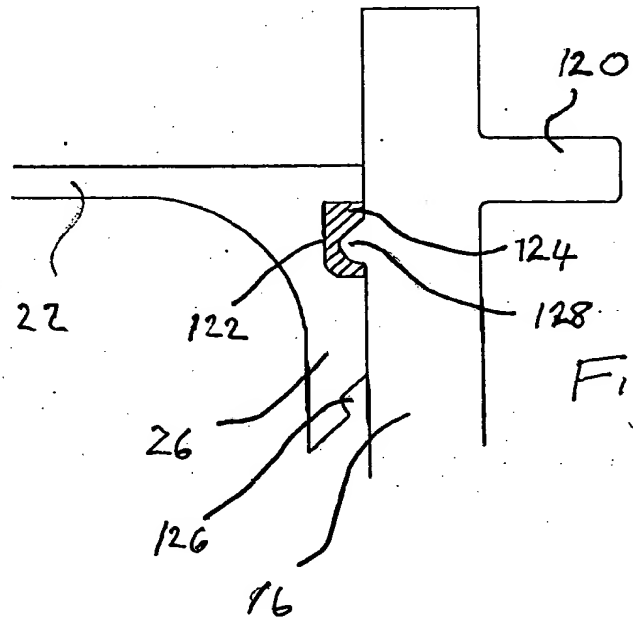


Fig 4

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